



## 6641 - NIRSpec IFU Field Calibration and Filter Distortion Check

Cycle: 3, Proposal Category: CAL/NIRSPEC

### INVESTIGATORS

<i>Name</i>	<i>Institution</i>
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### OBSERVATIONS

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
Observation Folder				
	1	W2-PRISM-Pointing	NIRSpec IFU Spectroscopy	(2) W2-PRISM-POINTING
	2	W2-8894	NIRSpec IFU Spectroscopy	(1) W2-8984
	3	W2-8894	NIRSpec IFU Spectroscopy	(1) W2-8984

### ABSTRACT

Our analysis and investigation by users show that point sources observed in the NIRSpec IFU wander in x/y position by up to ~0.6 pixels through the pipeline reduced data cubes. This effect is not seen in calibration model data (e.g., edge detection of slices), but these data are anchored to lamp files which do not use the science filters. The requested data on the astrometric field will allow us to investigate filter and cube build effects in the NRS IFU calibration model. There has never been a proper calibration observation of an astrometric field with the IFU – the one measurement acquired (in prism mode only) during commissioning failed to observe leakcal exposures and the data are highly contaminated by MSA leakage flux.

### OBSERVING DESCRIPTION

**OBJECTIVE:** The goal of this activity is to measure and calibrate field distortion effects seen in NIRSpec IFU data – and check if uncharacterized filter distortion needs to be added to the NIRSpec instrument model.

**METHOD:** Observations of the astrometric calibration field (several point sources per pointing) will be acquired with a dither pattern and mosaic raster scan across the IFU slices.

**JUSTIFICATION:** Our analysis and investigation by users show that point sources observed in the NIRSpec IFU wander in x/y position by up to ~0.6 pixels through the pipeline reduced data cubes. This effect is not seen in calibration model data (e.g., edge detection of slices), but these data are anchored to lamp files which do not use the science filters. The data on the astrometric field will allow us to investigate filter and cube build effects in the NRS IFU calibration model. To keep the calibration time viable, we are requesting observations in the three grating/filter combination settings that have the worst effects of the x/y PSF wander – this is PRISM, G140H and G395M. Leakcal exposures are required to correct out stellar leakage through the MSA from the crowded field, for proper centroid measurements on the stars. Wavecals will be acquired to test the difference in the spectral location with and without the filters (lamp calcs do not use the filters). A 9pt cycling dither will be used to optimize cube building parameters. A small 3pt mosaic raster scan with the PRISM will be carried out to check cross-slice offsets to verify the cube building effects.

**PREVIOUS CALIBRATIONS:** There has never been a proper calibration observation of an astrometric field with the IFU – the one measurement acquired (in prism mode only) during commissioning failed to observe leakcal exposures and the data are highly contaminated by MSA leakage flux. This is a new program for the first time in Cycle 3. We will be executing these important IFU field and filter calibrations that have never yet been observed.

**TIMING CONSTRAINTS:** No timing constraints. Observations are split into 2 parts because the PRISM measurement has an expanded dither/mosaic offset pattern.

# Proposal 6641 - Targets - NIRSpec IFU Field Calibration and Filter Distortion Check

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
	(1)	W2-8984	RA: 10 24 2.5590 (156.0106625d) Dec: -57 45 31.93 (-57.75887d) Equinox: J2000  <i>Comments: 1.6micron mag &lt;11.9</i> <i>Category=Stellar Cluster</i> <i>Description=[Open star clusters, Young associations]</i>	Proper Motion RA: -5.827 mas/yr Proper Motion Dec: 2.745 mas/yr Epoch of Position: 2015.5	
(2)	W2-PRISM-POINTING	RA: 10 23 59.2215 (155.9967562d) Dec: -57 45 30.71 (-57.75853d) Equinox: J2000  <i>Comments:</i> <i>Category=Stellar Cluster</i> <i>Description=[Open star clusters, Young associations]</i>			

Proposal 6641 - Observation 1 - NIRSpec IFU Field Calibration and Filter Distortion Check

Fri Jun 21 17:01:07 GMT 2024

<b>Observation</b>	<p><b>Proposal 6641, Observation 1: W2-PRISM-Pointing</b></p> <p><b>Diagnostic Status: Warning</b></p> <p>Observing Template: NIRSpec IFU Spectroscopy</p>											
<b>Diagnostics</b>	(Visit 1:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.											
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>			<b>Targ. Coord. Corrections</b>			<b>Miscellaneous</b>			
	(2)	W2-PRISM-POINTING	RA: 10 23 59.2215 (155.9967562d) Dec: -57 45 30.71 (-57.75853d) Equinox: J2000									
	<p><i>Comments:</i>                  Category=Stellar Cluster                  Description=[Open star clusters, Young associations]</p>											
<b>Template</b>	<b>TA Method</b>											
	NONE											
<b>Mosaic</b>	<b>Rows</b>	<b>Columns</b>	<b>Row Overlap %</b>	<b>Column Overlap %</b>	<b>Row shift (deg)</b>	<b>Column shift (deg)</b>	<b>Tile Order</b>					
	1	20	0.0	96.667	0.0	0.0	DEFAULT					
<b>Dithers</b>	<b>#</b>	<b>Dither Type</b>	<b>Size</b>	<b>Starting Point</b>	<b>Number of Points</b>	<b>Points</b>						
	1	NONE										
<b>Spectral Elements</b>	<b>#</b>	<b>Grating/Filter</b>	<b>Readout Pattern</b>	<b>Groups/Int</b>	<b>Integrations/Exp</b>	<b>Leakcal</b>	<b>Dither</b>	<b>Autocal</b>	<b>Total Dithers</b>	<b>Total Integrations</b>	<b>Total Exposure Time</b>	<b>ETC Wkbk.Calc ID</b>
	1	PRISM/CLEAR	NRSIRS2RAPID	5	3	false	false	NONE	1	3	262.6	
	2	PRISM/CLEAR	NRSIRS2RAPID	5	3	true	false	NONE	1	3	262.6	

Proposal 6641 - Observation 2 - NIRSpec IFU Field Calibration and Filter Distortion Check

Fri Jun 21 17:01:07 GMT 2024

<b>Observation</b>	<b>Proposal 6641, Observation 2: W2-8894</b> <b>Diagnostic Status: Warning</b> Observing Template: NIRSpec IFU Spectroscopy											
	(Visit 2:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.											
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>			<b>Targ. Coord. Corrections</b>			<b>Miscellaneous</b>			
	(1)	W2-8984	RA: 10 24 2.5590 (156.0106625d) Dec: -57 45 31.93 (-57.75887d) Equinox: J2000			Proper Motion RA: -5.827 mas/yr Proper Motion Dec: 2.745 mas/yr Epoch of Position: 2015.5						
<i>Comments: 1.6micron mag &lt;11.9</i> <i>Category=Stellar Cluster</i> <i>Description=[Open star clusters, Young associations]</i>												
<b>Template</b>	<b>TA Method</b>											
	NONE											
<b>Mosaic</b>	<b>Rows</b>	<b>Columns</b>	<b>Row Overlap %</b>	<b>Column Overlap %</b>	<b>Row shift (deg)</b>	<b>Column shift (deg)</b>	<b>Tile Order</b>					
	1	20	10.0	96.667	0.0	0.0	DEFAULT					
<b>Dithers</b>	<b>#</b>	<b>Dither Type</b>	<b>Size</b>	<b>Starting Point</b>	<b>Number of Points</b>	<b>Points</b>						
	1	NONE										
<b>Spectral Elements</b>	<b>#</b>	<b>Grating/Filter</b>	<b>Readout Pattern</b>	<b>Groups/Int</b>	<b>Integrations/Exp</b>	<b>Leakcal</b>	<b>Dither</b>	<b>Autocal</b>	<b>Total Dithers</b>	<b>Total Integrations</b>	<b>Total Exposure Time</b>	<b>ETC Wbk. Calc ID</b>
	1	G140H/F070LP	NRSIRS2RAPI D	12	1	false	false	NONE	1	1	189.656	
	2	G140H/F070LP	NRSIRS2RAPI D	12	1	true	false	NONE	1	1	189.656	
	3	G140H/F100LP	NRSIRS2RAPI D	12	1	true	false	NONE	1	1	189.656	
	4	G140H/F100LP	NRSIRS2RAPI D	12	1	false	false	NONE	1	1	189.656	
	5	G395M/F290LP	NRSIRS2RAPI D	9	1	false	false	NONE	1	1	145.889	
	6	G395M/F290LP	NRSIRS2RAPI D	9	1	true	false	NONE	1	1	145.889	
	7	G235M/F170LP	NRSIRS2RAPI D	6	1	true	false	NONE	1	1	102.122	
	8	G235M/F170LP	NRSIRS2RAPI D	6	1	false	false	NONE	1	1	102.122	

Proposal 6641 - Observation 2 - NIRSpec IFU Field Calibration and Filter Distortion Check

Special Requirements

Aperture PA Range 270.97164917 to 281.77164917 Degrees (V3 132.0 to 142.8)  
No Parallel Attachments

Proposal 6641 - Observation 3 - NIRSpec IFU Field Calibration and Filter Distortion Check

Fri Jun 21 17:01:07 GMT 2024

<b>Observation</b>	<b>Proposal 6641, Observation 3: W2-8894</b> <b>Diagnostic Status: Warning</b> Observing Template: NIRSpec IFU Spectroscopy											
	(Visit 3:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.											
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>			<b>Targ. Coord. Corrections</b>			<b>Miscellaneous</b>			
	(1)	W2-8984	RA: 10 24 2.5590 (156.0106625d) Dec: -57 45 31.93 (-57.75887d) Equinox: J2000			Proper Motion RA: -5.827 mas/yr Proper Motion Dec: 2.745 mas/yr Epoch of Position: 2015.5						
<i>Comments: 1.6micron mag &lt;11.9</i> <i>Category=Stellar Cluster</i> <i>Description=[Open star clusters, Young associations]</i>												
<b>Template</b>	<b>TA Method</b>											
	NONE											
<b>Mosaic</b>	<b>Rows</b>	<b>Columns</b>	<b>Row Overlap %</b>	<b>Column Overlap %</b>	<b>Row shift (deg)</b>	<b>Column shift (deg)</b>	<b>Tile Order</b>					
	1	20	10.0	96.667	0.0	0.0	DEFAULT					
<b>Dithers</b>	<b>#</b>	<b>Dither Type</b>	<b>Size</b>	<b>Starting Point</b>	<b>Number of Points</b>	<b>Points</b>						
	1	NONE										
<b>Spectral Elements</b>	<b>#</b>	<b>Grating/Filter</b>	<b>Readout Pattern</b>	<b>Groups/Int</b>	<b>Integrations/Exp</b>	<b>Leakcal</b>	<b>Dither</b>	<b>Autocal</b>	<b>Total Dithers</b>	<b>Total Integrations</b>	<b>Total Exposure Time</b>	<b>ETC Wbk. Calc ID</b>
	1	G235H/F170LP	NRSIRS2RAPID	12	1	false	false	NONE	1	1	189.656	
	2	G235H/F170LP	NRSIRS2RAPID	12	1	true	false	NONE	1	1	189.656	
	3	G395H/F290LP	NRSIRS2RAPID	10	1	true	false	NONE	1	1	160.478	
	4	G395H/F290LP	NRSIRS2RAPID	10	1	false	false	NONE	1	1	160.478	
	5	G140M/F100LP	NRSIRS2RAPID	4	2	false	false	NONE	1	2	145.889	
	6	G140M/F100LP	NRSIRS2RAPID	4	2	true	false	NONE	1	2	145.889	
	7	G140M/F070LP	NRSIRS2RAPID	4	2	true	false	NONE	1	2	145.889	
	8	G140M/F070LP	NRSIRS2RAPID	4	2	false	false	NONE	1	2	145.889	

Proposal 6641 - Observation 3 - NIRSpec IFU Field Calibration and Filter Distortion Check

Special Requirements

Aperture PA Range 270.97164917 to 281.77164917 Degrees (V3 132.0 to 142.8)  
No Parallel Attachments